



Transportation

## Corporate Jet

**At right** is the Gulfstream IV (G-IV), newest member of a family of business aircraft manufactured by Gulfstream Aerospace Corporation, Savannah, Georgia. The G-IV features an advanced, lighter, more aerodynamically efficient new wing that was designed with the aid of several NASA-developed computer programs.

*An efficient new wing was designed with the aid of several NASA-developed computer programs*

**At right center** is a cockpit view of the G-IV; **the far right photos** show features of the G-IV's luxurious interior.

The 19-passenger airplane, which holds the international record in its class for round-the-world flight, has a fully computerized, automated flight management system, a range of 5,000 miles and a maximum speed capability of Mach 0.88, meaning 88 percent of the speed of sound or about 580 miles per hour at cruising altitudes. Flying at near this maximum speed, the airplane encounters a phenomenon known as transonic drag rise, an increase in the drag force created by shock waves that develop on the wing as the airplane approaches the speed of sound. This drag rise reduces fuel efficiency.

Gulfstream Aerospace engineers used an enhanced version of a NASA program called WIBCO to analyze aerodynamic design features intended to reduce transonic drag. For other elements of the design, they used the programs STANS5 and PROFILE.

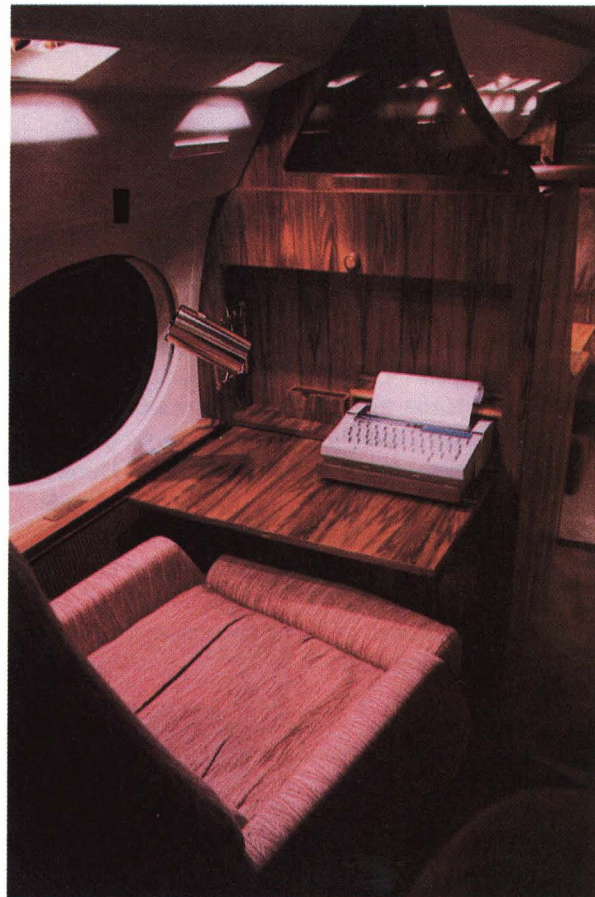
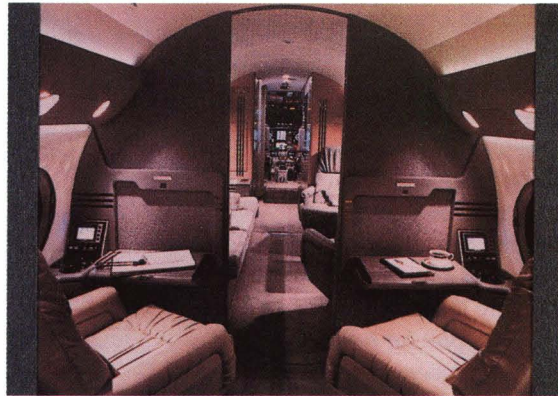


Another NASA program — GASP — may play a part in a major undertaking the company hopes to initiate in cooperation with Sukhoi Design Bureau, a Soviet organization: development of an intercontinental supersonic business jet.

Gulfstream Aerospace researchers intend to use GASP in conjunction with other programs in development of a dynamically new aircraft configuration. Originally developed to perform tasks associated with the preliminary phases of aircraft design, GASP will help researchers determine gross weight, range, speed, payload and optimum wing area for the new airplane. The aerodynamic and propulsion segments of the program will allow evaluation of the type of engine required to meet payload specifications.

The GASP program was specifically developed to compare configurations and assess performance of general aviation aircraft or small transports; it was modified to fit Gulfstream Aerospace's current applications.





Use of the NASA programs allows company engineers the freedom to experiment with different geometries to arrive at the optimum parametric requirements for their new aircraft. By using already developed programs, the company saves the cost of developing new software and effects additional economies in reduced man-hours and overall design time. WIBCO, STANS5, PROFILE and GASP were provided to Gulfstream Aerospace by NASA's Computer Software Management and Information Center (COSMIC). Located at the University of Georgia, Athens, Georgia, COSMIC supplies government-developed computer programs adaptable to secondary uses to government, industry, and academic institutions (**see page 140**).

*Use of  
the NASA  
programs  
allows  
company  
engineers  
the freedom  
to  
experiment*